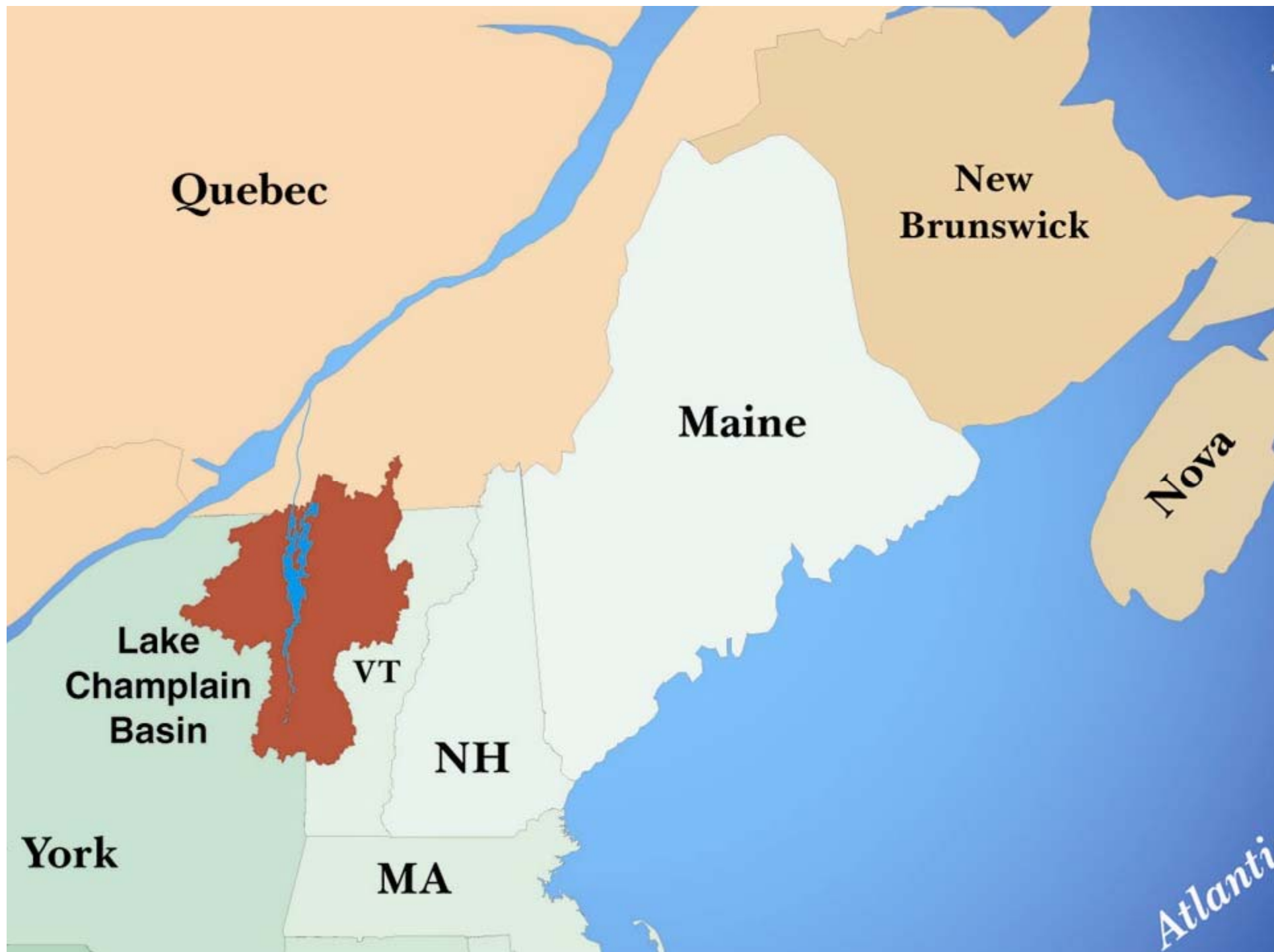




Lessons Learned from the Lake Champlain Basin Boat Launch Steward Program



Meg Modley
Aquatic Invasive Species Management Coordinator
Lake Champlain Basin Program
Collaborators: Eric Holmlund, Paul Smiths College
Emily Debolt, Lake George Association



The Lake Champlain Basin Program



Partnership between...

- New York, Vermont, Quebec, US EPA, Local groups, etc.

Created by...

- Congress via the Lake Champlain Special Designation Act of 1990.

Watershed-based non-profit...

- That coordinates implementation of *Opportunities for Action*.



Aquatic non-native and invasive species pressures on the Lake Champlain Basin



DATA SOURCE: UVM, Lake Champlain Sea Grant, Great Lakes Environmental Research Laboratory, Lafontaine and Costan 2002, and Strayer 2012.

Lake Champlain Boat Launch Steward Program: 2007-2013

*Modeled after the Paul Smiths College Adirondack Watershed Institute Program

- 2007 steward program grew from 4 steward to 10 stewards in 2013
- Program Season: Memorial Day to Labor Day (8hr days up to 4 days/week '13)
- Location: high use VT Dept of Fish and Wildlife and NY State DEC boat launches on Lake Champlain

Risk Assessment – Greet boat launch users, conduct courtesy inspections, collect data on AIS spread prevention behavior, inform users/hand out educational materials



Key AIS spread prevention questions:

- 1) What is the last waterbody your vessel visited in the previous two weeks?
- 2) Do you take any measures to prevent the spread of AIS?
- 3) New – where do you intend to launch your vessel next?

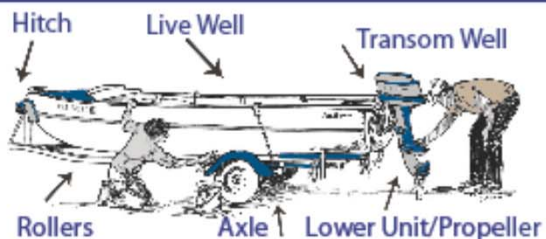


CLEAN BOATS CLEAN WATERS




Watch out for unwanted aquatic hitchhikers when you move from one waterway to another!

Aquatic invasive species (AIS) are non-native plants and animals that threaten native plants, wildlife, and their habitat. They also affect humans by degrading boating and fishing areas and reducing lake shore property values and tourism. Once AIS are established, eradication is almost impossible.

WATERCRAFT CHECK POINTS



When you leave a waterway:

-  **Check** and remove any visible mud, plants, fish or organisms from boats, trailers, equipment, clothing, dogs, etc.
 -  **Clean** and eliminate water from equipment.
 -  **Dry** anything that comes into contact with water.
- Never release plants, fish, or other animals into a waterway unless they came from that waterway.



Vermont laws pertaining to AIS:

10 V.S.A. § 1454. TRANSPORT OF AQUATIC PLANTS AND AQUATIC NUISANCE SPECIES

No person shall transport an aquatic plant or aquatic plant part, zebra mussels (*Dreissena polymorpha*), quagga mussels (*Dreissena bugensis*), or other aquatic nuisance species identified by the secretary by rule to or from any Vermont waters on the outside of a vehicle, boat, personal watercraft, trailer, or other equipment. This section shall not restrict proper harvesting or other control activities undertaken for the purpose of eliminating or controlling the growth or propagation of aquatic plants, zebra mussels, quagga mussels, or other aquatic nuisance species.



Clean Boats Clean Waters

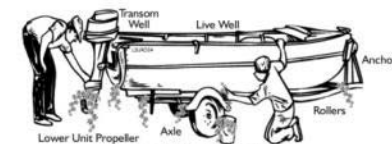
Before Launching AND Before Leaving

Clean off any mud, plants, and animals from boats, trailers, and equipment.

Drain your boat and equipment away from the water.

Dry anything that comes into contact with the water.

Never release plants, fish or animals into a body of water unless they came out of that body of water



STOP AQUATIC HITCHHIKERS!

Prevent the transport of nuisance species. Clean all recreational equipment. www.ProtectYourWaters.net

Under Vermont Law, you may be fined up to \$1000 for transporting any aquatic plant or plant fragment, zebra mussels or quagga mussels.

(pursuant to 10 V.S.A. 1454, 23 V.S.A. 3317, 6 V.S.A. 1034, 1037 & 1038)



Please report suspected aquatic invasive species sightings to:

(802) 828-1535

www.vtwaterquality.org

Aquatic Invasive Species Laws in VT and NY

VERMONT:

Transport of Aquatic Plants and Aquatic Nuisance Species

Felt soled wader use ban

Baitfish regulations

Noxious species lists



NEW YORK

County and town transport laws – no statewide law

Baitfish regulations\

Implementing a species listing bill



Boat Launch Steward Field Data Sheet

Lake Champlain Steward Survey

Total # of Groups:

Boat Launch:

Weather:

Steward Name:

Date:

	Boat Type	Group Size	State of Registration	Launch/Retrieve (circle one)		Time of Inspection (military)	Prior BLS contact? (circle one)		Does the Visitor Take Spread Prevention Steps? Write in Steps Taken!!	Aquatic Organism(s) Found? (circle one)		Species Identification	Brochure or Sticker? (circle)		Last Waterbody Visited in Prior 2 Weeks? (name, town, state)	What Waterbody Will the Visitor Go To Next? (name, town, state)
1				L	R		Y	N		Y	N		B	S		
2				L	R		Y	N		Y	N		B	S		
3				L	R		Y	N		Y	N		B	S		
4				L	R		Y	N		Y	N		B	S		
5				L	R		Y	N		Y	N		B	S		
6				L	R		Y	N		Y	N		B	S		
7				L	R		Y	N		Y	N		B	S		
8				L	R		Y	N		Y	N		B	S		
9				L	R		Y	N		Y	N		B	S		
10				L	R		Y	N		Y	N		B	S		
11				L	R		Y	N		Y	N		B	S		
12				L	R		Y	N		Y	N		B	S		
13				L	R		Y	N		Y	N		B	S		
14				L	R		Y	N		Y	N		B	S		
15				L	R		Y	N		Y	N		B	S		
16				L	R		Y	N		Y	N		B	S		
17				L	R		Y	N		Y	N		B	S		
18				L	R		Y	N		Y	N		B	S		
19				L	R		Y	N		Y	N		B	S		
20				L	R		Y	N		Y	N		B	S		

Boat Type = M=motorboat; PWC= personal watercraft; S =sailboat; C= canoe; K = kayak; R = rowboat/ # > 1
B/S = B for Brochure, S for Sticker (circle one, both or none)

Spread Prevention = I (inspected), WB (washed boat), DB (drained bilge water),
BB (drained bait buckets), LW (drained or treated live well), Disp (dispose of bait properly)
DRY (dry boat and equipment); **NONE** (no steps taken); **N/A** (did not ask)

Species Identification = EWM= Eurasian Watermilfoil; EG= Eel

Grass; WC= Water Chestnut;

CLP = Curly-Leaf Pondweed; NP = Native Pondweed; EL = Elodea (waterweed);

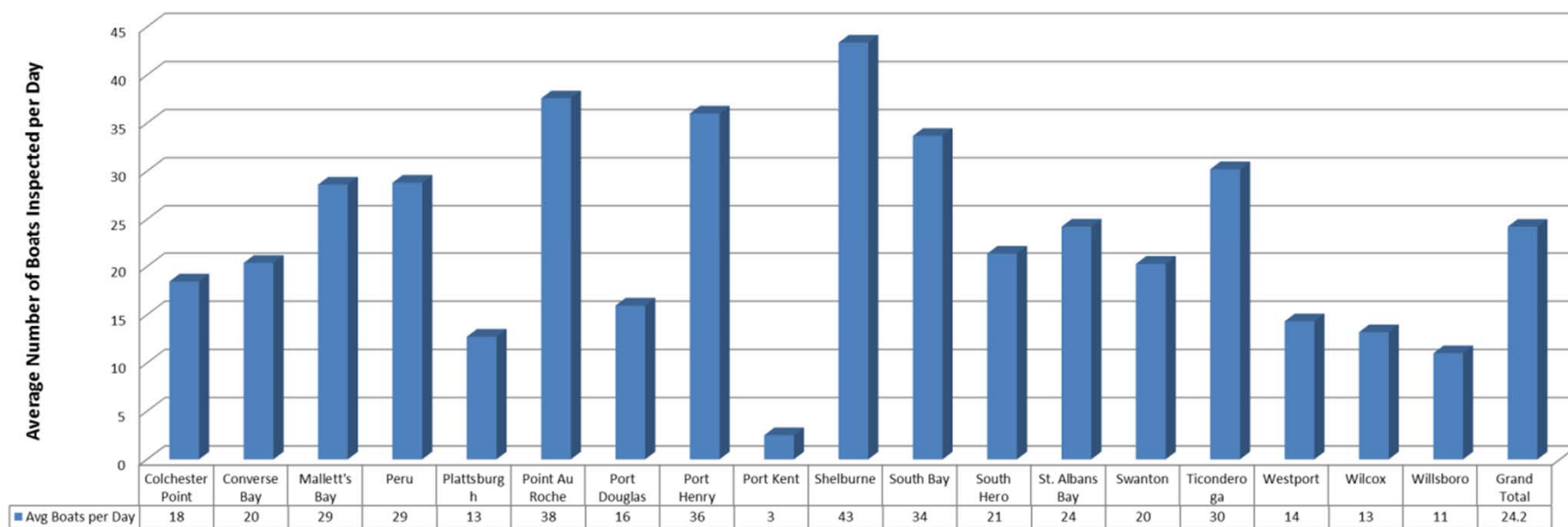
ZM= Zebra Mussels; CT= Coontail; VLM= Variable Leaf Milfoil; **UNKNOWN**; write in others

Collect a sample if the species is identified as INVASIVE or UNKNOWN

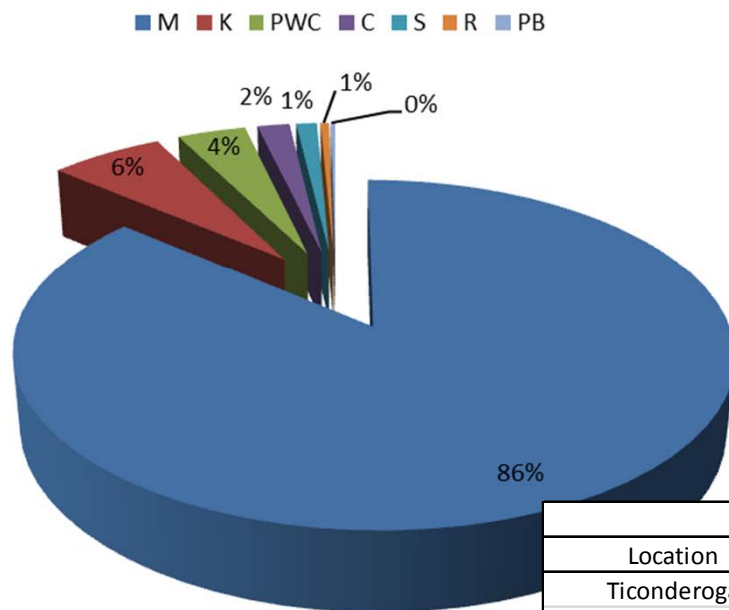
2013 Season Results

Data					
Location	Number of Boats	Number of Visitors	Steward Days	Avg Boats per Day	Avg People per Day
Colchester Point	332	545	18	18	30
Converse Bay	428	841	21	20	40
Mallett's Bay	1602	3400	56	29	61
Peru	1699	3638	59	29	62
Plattsburgh	267	602	21	13	29
Point Au Roche	864	2090	23	38	91
Port Douglas	319	872	20	16	44
Port Henry	108	247	3	36	82
Port Kent	5	10	2	3	5
Shelburne	1214	2346	28	43	84
South Bay	101	206	3	34	69
South Hero	448	1020	28	21	49
St. Albans Bay	945	1952	39	24	50
Swanton	669	1406	33	20	43
Ticonderoga	2416	4727	80	30	59
Westport	687	1535	48	14	32
Wilcox	699	1621	53	13	31
Willsboro	11	20	1	11	20
Grand Total	12814	27078	529	24.2	51.2

Average Number of Boats Inspected per Day



Boat Types Used on Lake Champlain as Percent of All Boat Types

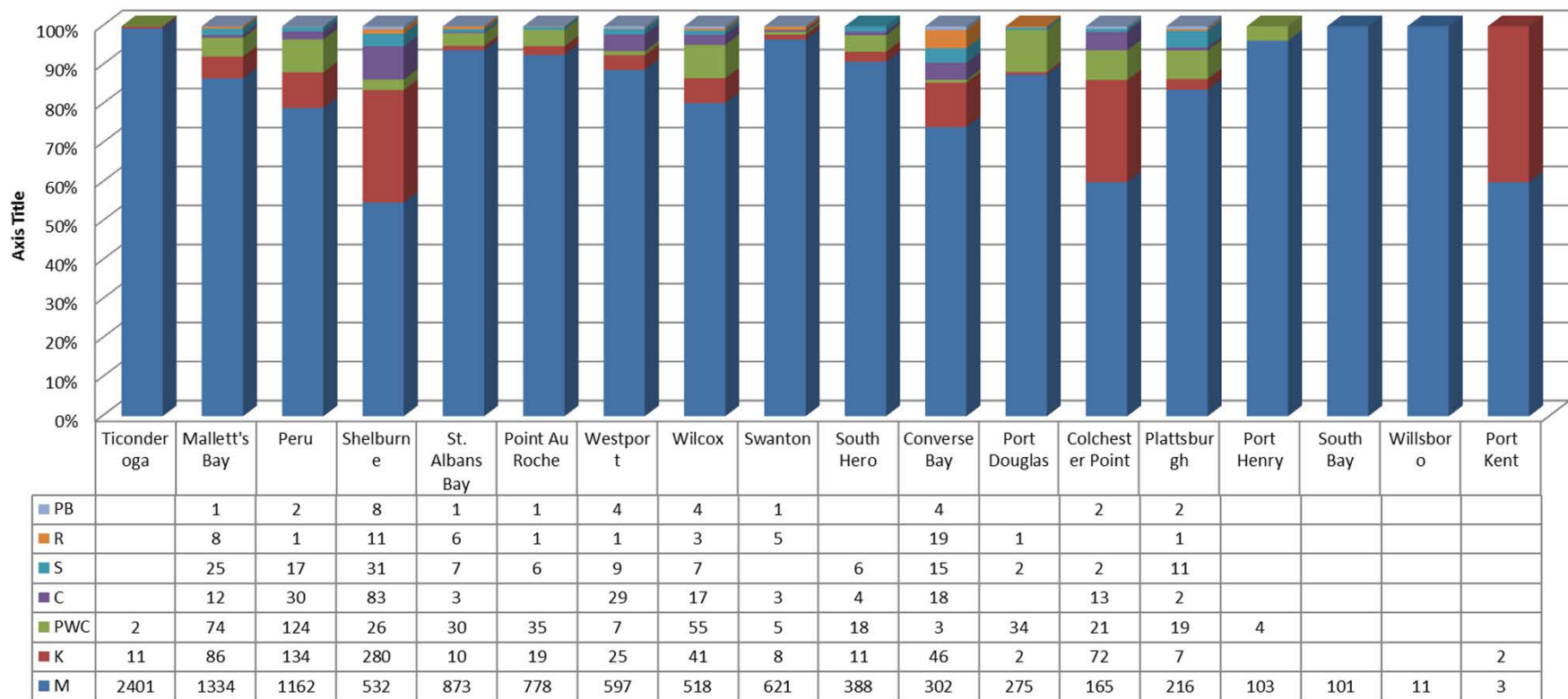


Motorboats
Kayaks
Personal watercraft
Canoe
Sailboats
Row boats
Paddle boards

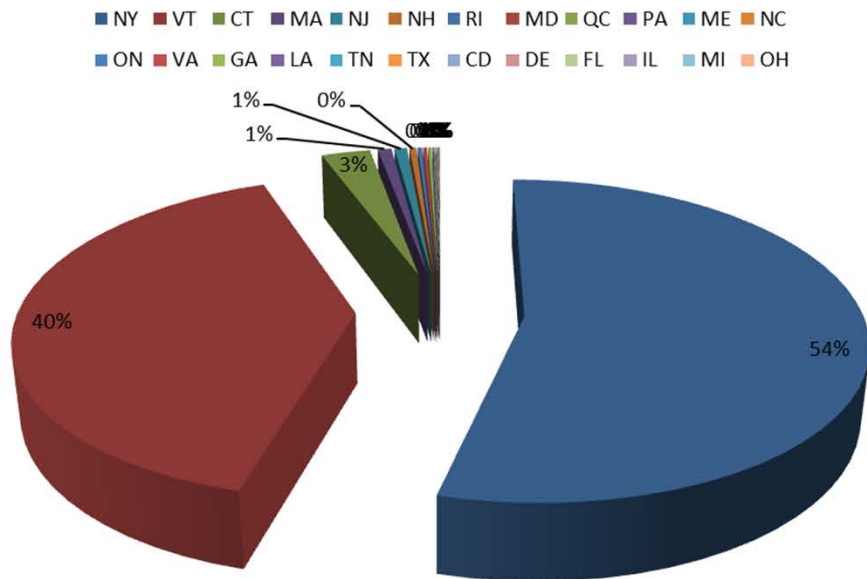
Location	Count of Boat Type							Grand Total
	M	K	PWC	C	S	R	PB	
Ticonderoga	2401	11	2					2414
Mallett's Bay	1334	86	74	12	25	8	1	1540
Peru	1162	134	124	30	17	1	2	1470
Shelburne	532	280	26	83	31	11	8	971
St. Albans Bay	873	10	30	3	7	6	1	930
Point Au Roche	778	19	35		6	1	1	840
Westport	597	25	7	29	9	1	4	672
Wilcox	518	41	55	17	7	3	4	645
Swanton	621	8	5	3		5	1	643
South Hero	388	11	18	4	6			427
Converse Bay	302	46	3	18	15	19	4	407
Port Douglas	275	2	34		2	1		314
Colchester Point	165	72	21	13	2		2	275
Plattsburgh	216	7	19	2	11	1	2	258
Port Henry	103		4					107
South Bay	101							101
Willsboro	11							11
Port Kent	3	2						5
Grand Total	10380	754	457	214	138	57	30	12030

What type of boat might be expected based on boat launch site?

Boat Type as % of Boats at Launch



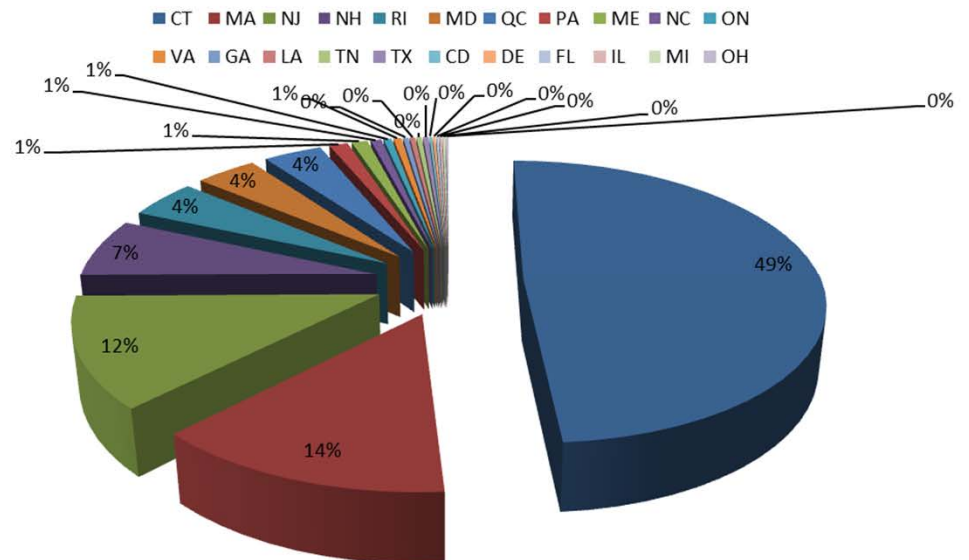
Source of All Boat Types Used on Lake Champlain



What state/province are boats using Lake Champlain launches registered in?

(non motorized vessels are not registered)

Source of All Boat Types Used on Lake Champlain Other than from VT and NY

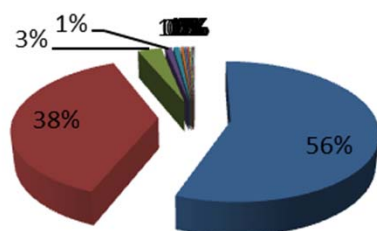


Last Waterbody (State)	Count of Boat Type							
	M	K	PWC	C	S	R	PB	Grand Total
NY	5069	208	247	54	33	9	12	5632
VT	3430	401	140	105	59	38	10	4183
CT	285	1	1					287
MA	78	1			1			80
NJ	73							73
NH	37	1	1	1				40
RI	24	2						26
MD	23							23
QC	20	1		1				22
PA	7							7
ME	4	2						6
NC	4							4
ON	3							3
VA	3							3
GA	2							2
LA	2							2
TN	2							2
TX	2							2
CD	1							1
DE	1							1
FL	1							1
IL	1							1
MI	1							1
OH	1							1
Grand Total	9074	617	389	161	93	47	22	10403

Different vessels = different spread prevention messages. Where are they coming from?

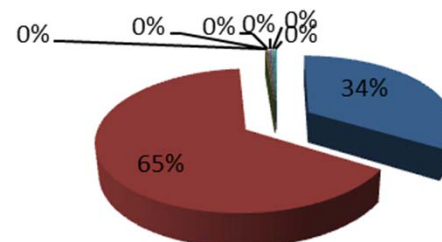
All Sources of Motor Boats

■ NY ■ VT ■ CT ■ MA ■ NJ ■ NH ■ RI ■ MD
■ QC ■ PA ■ ME ■ NC ■ ON ■ VA ■ GA ■ LA
■ TN ■ TX ■ CD ■ DE ■ FL ■ IL ■ MI ■ OH



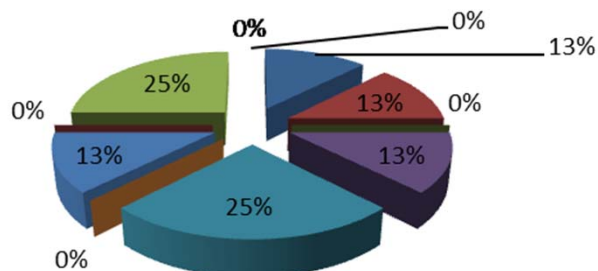
All Sources Kayaks

■ NY ■ VT ■ CT ■ MA ■ NJ ■ NH ■ RI ■ MD
■ QC ■ PA ■ ME ■ NC ■ ON ■ VA ■ GA ■ LA
■ TN ■ TX ■ CD ■ DE ■ FL ■ IL ■ MI ■ OH



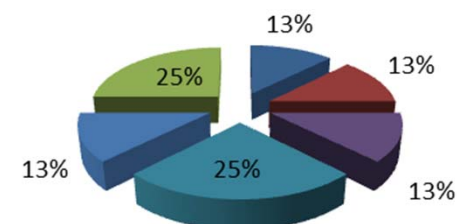
Sources of Motor Boats from States Other than VT and NY

■ CT ■ MA ■ NJ ■ NH ■ RI ■ MD ■ QC ■ PA ■ ME ■ NC ■ ON
■ VA ■ GA ■ LA ■ TN ■ TX ■ CD ■ DE ■ FL ■ IL ■ MI ■ OH



Sources of Kayaks from States Other than VT and NY

■ CT ■ MA ■ NJ ■ NH ■ RI ■ MD ■ QC ■ PA
■ ME ■ NC ■ ON ■ VA ■ GA ■ LA ■ TN ■ TX
■ CD ■ DE ■ FL ■ IL ■ MI ■ OH





75.6% of boat launch users have had prior boat launch steward contact

Does the Visitor Take Spread Prevention Steps? (Y/N)	Prior BLS Contact (Y/N)		Grand Total	Percent w/ Prior BLS Contact
	Y	N		
Y	7602	2250	9852	77.2
NONE	467	354	821	56.9
Grand Total	8069	2604	10673	75.6
Percent that take Spread Prevention Steps	94.2	86.4	92.3	

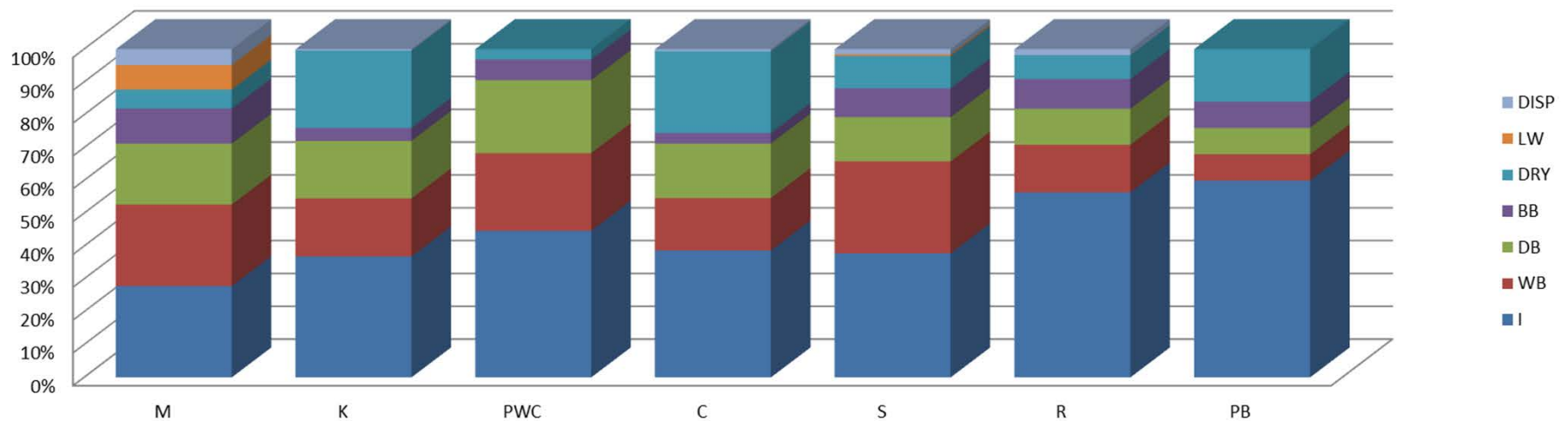
85.3% of visitors take one or more spread prevention measures

Visitors Taking Prevention Steps				
Location	Y	N	Grand Total	% Taking SPM
South Bay	101	0	101	100.0
Ticonderoga	2413	1	2414	100.0
Westport	665	7	672	99.0
St. Albans Bay	785	142	927	84.7
Point Au Roche	677	142	819	82.7
Mallett's Bay	1090	232	1322	82.5
Shelburne	768	176	944	81.4
Swanton	517	125	642	80.5
Converse Bay	321	86	407	78.9
Wilcox	500	135	635	78.7
Colchester Point	190	53	243	78.2
Port Henry	81	23	104	77.9
Plattsburgh	191	55	246	77.6
Port Douglas	239	70	309	77.3
South Hero	291	90	381	76.4
Peru	1084	365	1449	74.8
Willsboro	7	4	11	63.6
Port Kent	3	2	5	60.0
Grand Total	9923	1708	11631	85.3

What spread prevention measures are boat type users taking?
This will help target our education and outreach in the future

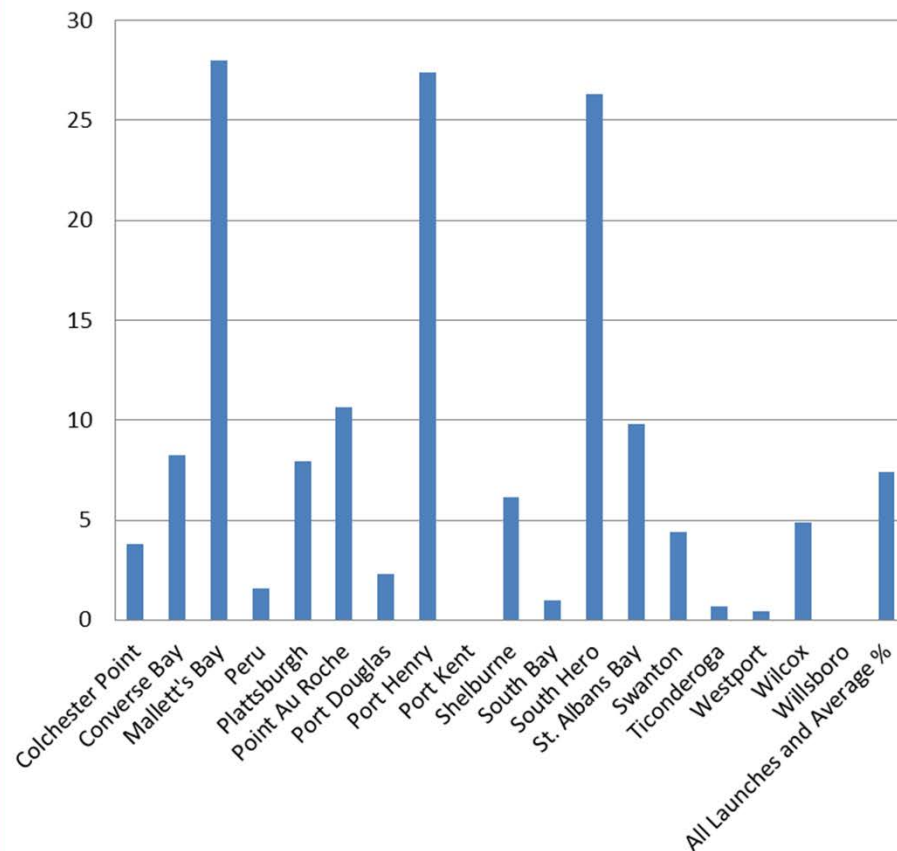
Boat Type	Count Boat Type	Count of I	Count of WB	Count of DB	Count of BB	Count of Dry	Count of LW	Count of Disp	Grand Total
M	10380	5268	4698	3511	2027	1097	1409	916	18926
K	754	429	206	204	46	274		5	1164
PWC	457	213	113	106	30	15			477
C	214	121	50	52	10	78		2	313
S	138	73	54	26	17	19	1	3	193
R	57	31	8	6	5	4		1	55
PB	29	15	2	2	2	4			25
Grand Total	12029	6150	5131	3907	2137	1491	1410	927	21153

Prevention Steps Taken by Boat Types against 100%



826 samples were collected from
boats launching or retrieving from Lake
Champlain
(there were often multiple species in a sample)

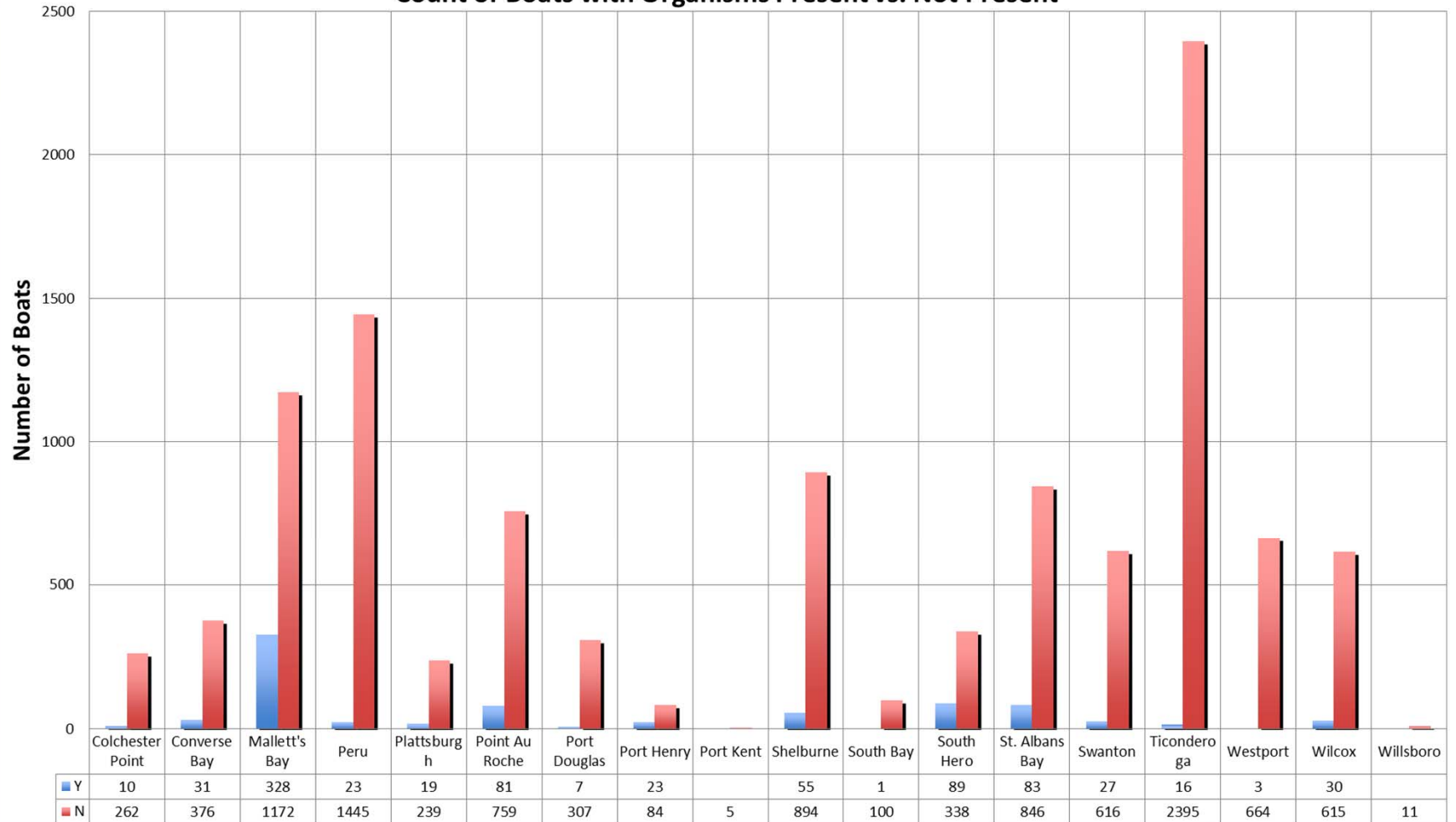
Percent Boats w/ Aq. Specimens



Aquatic Organisms Present?				
	Column Labels			
	Y	N	Grand Total	Percentage
Launch				
Colchester Point	10	262	272	3.8
Converse Bay	31	376	407	8.2
Mallett's Bay	328	1172	1500	28
Peru	23	1445	1468	1.6
Plattsburgh	19	239	258	7.9
Point Au Roche	81	759	840	10.7
Port Douglas	7	307	314	2.3
Port Henry	23	84	107	27.4
Port Kent		5	5	0
Shelburne	55	894	949	6.2
South Bay	1	100	101	1
South Hero	89	338	427	26.3
St. Albans Bay	83	846	929	9.8
Swanton	27	616	643	4.4
Ticonderoga	16	2395	2411	0.7
Westport	3	664	667	0.5
Wilcox	30	615	645	4.9
Willsboro		11	11	0
Percent of All Boats at Launches	826	11128	11954	7.4
36% of All Species are Invasive	297.36			2.5

7.4% of all
boats surveyed had
aquatic organisms
present
(36% of those
organisms were
invasive = **2.5%**
of boats had
invasives)

Count of Boats with Organisms Present vs. Not Present



Some launches had more boats with organisms present than others. Plant growth at some launches is more prevalent and results in more organisms on retrieving vessels.

1338 species were collected

59.4% of all specimens were verified for positive identification by the QA and Data Manager

Invasive species = 483

I	483
EWM	317
CLP	134
ZM	25
Faucet Snail	2
BURR REED	1
VLM	1
Banded Mystery Snails	1
Rusty Crayfish	1
White Perch	1

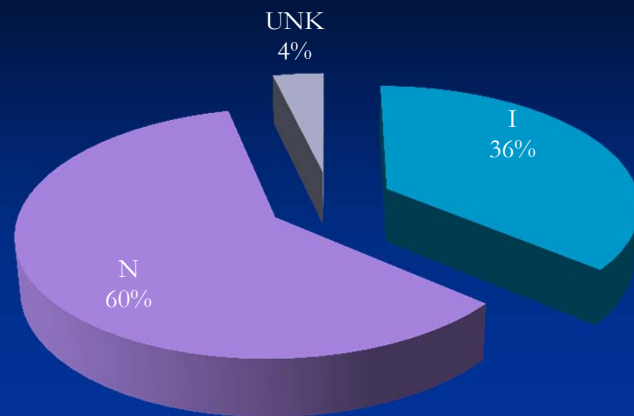
Unknown species = 50

UNK	50
UNK	34
Algae Slim	9
SNAILS	5
MUDDY	1
SEDGE	1

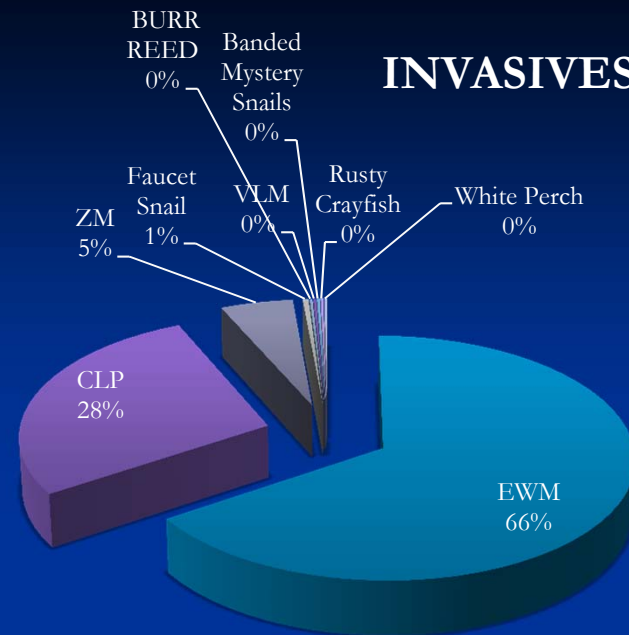
Native species = 805

N	805
EL	338
EG	195
NP	177
CT	64
WATER BUTTERCUP	4
Duck Weed	3
Native sp	3
LAWN GRASS	3
NATIVE WM	3
Cattail	2
Water Lilies	2
Common Waterweed	1
NATIVE WILD GRASS	1
Water Marigold	1
Water Stargrass	1
BIND WEED	1
Leech	1
Native Elodea or Pondweed Stem	1
Native Pond Grass	1
Native Sedge	1
Nuttall's Waterweed	1
Water Spider	1

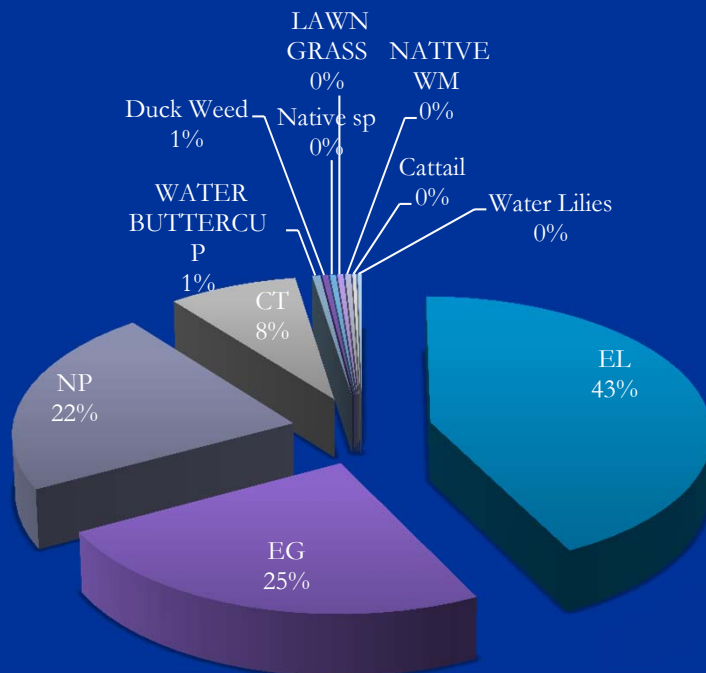
INUNK % of Total Specimens



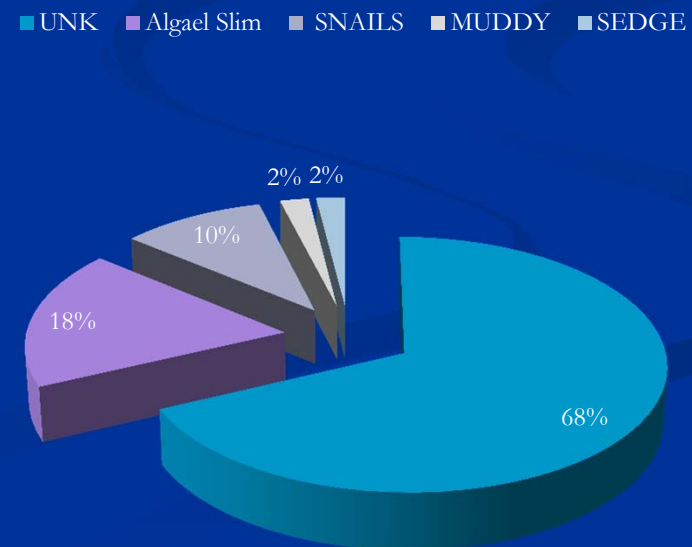
INVASIVES



NATIVES

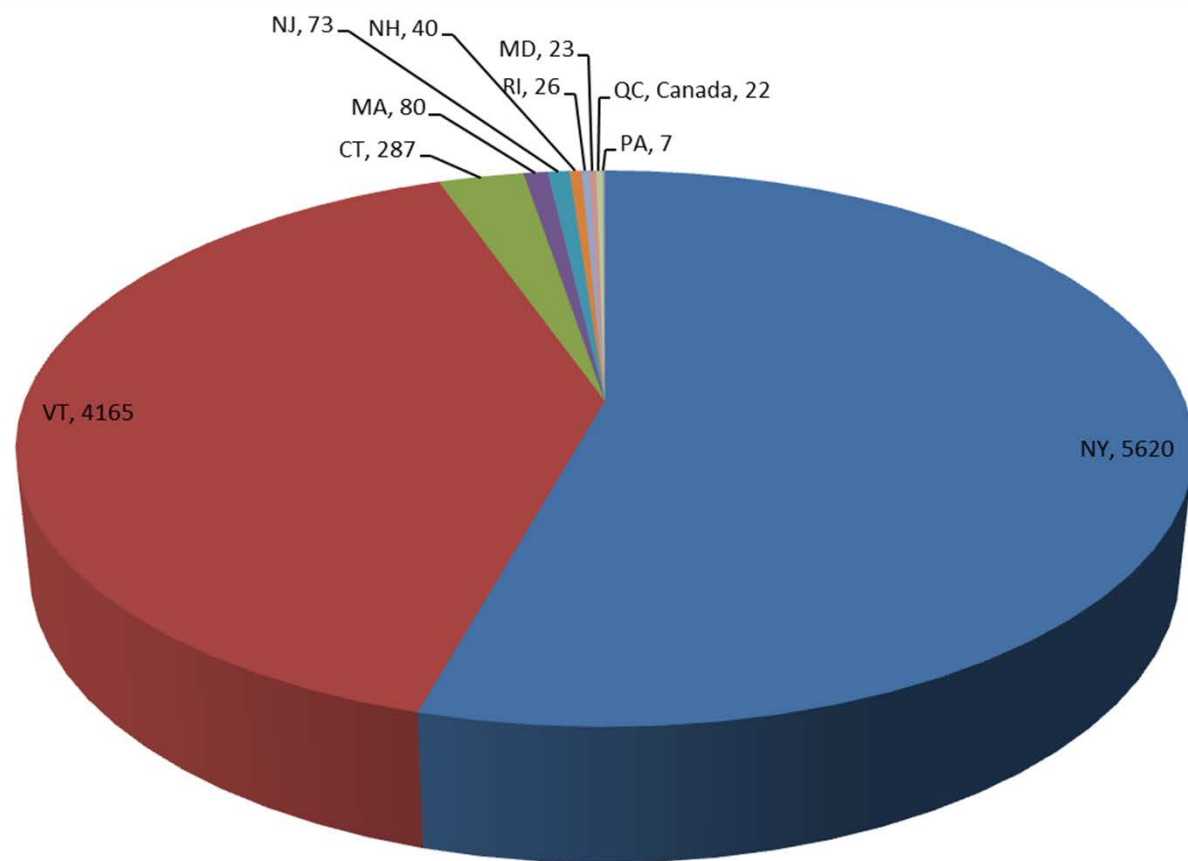


Unknowns

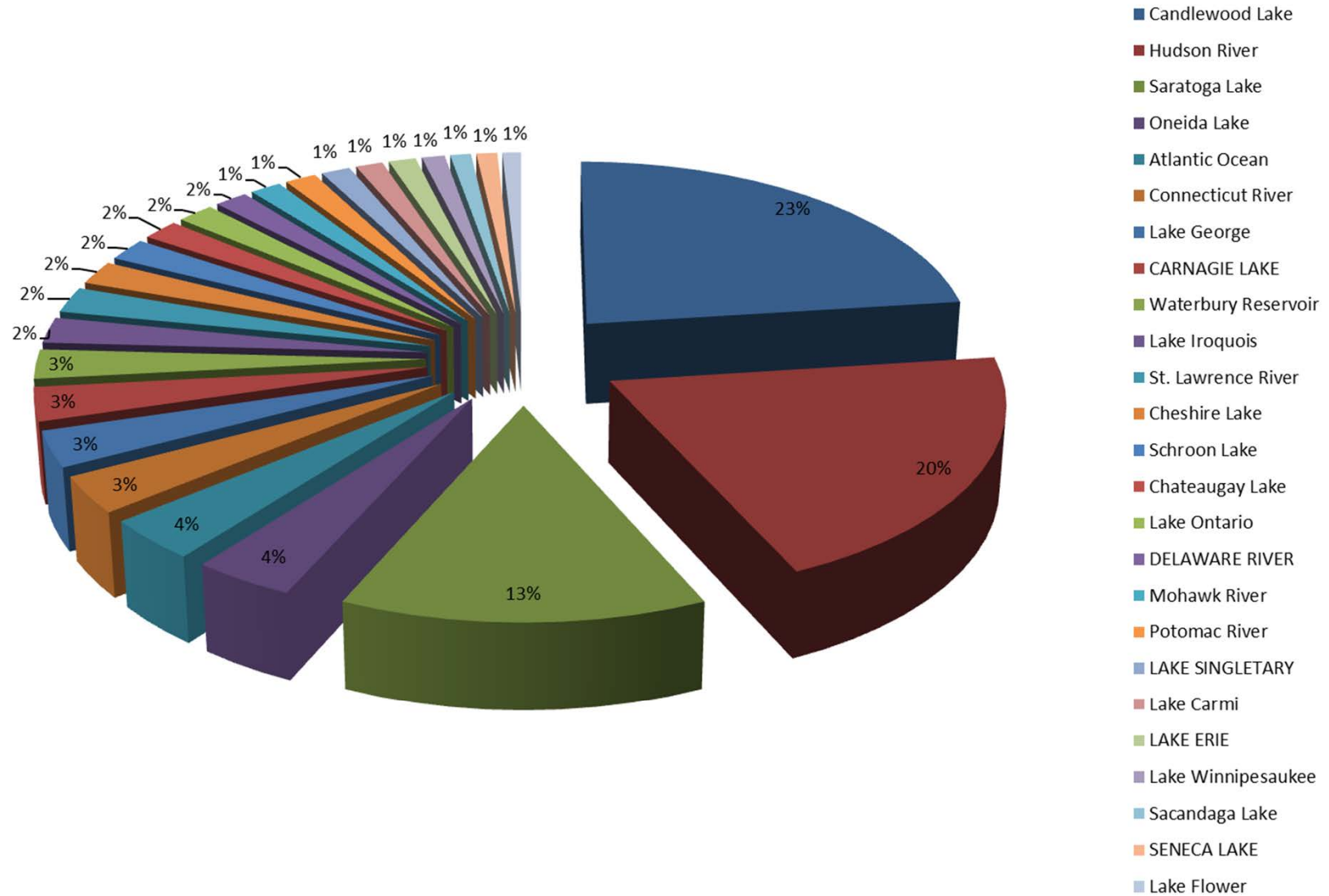


State of Last Waterbody Visited	# Boats
NY	5620
VT	4165
CT	287
MA	80
NJ	73
NH	40
RI	26
MD	23
QC, Canada	22
PA	7
ME	6
NC	4
ON, Canada	3
VA	3
GA	2
LA	2
TN	2
TX	2
CD	1
DE	1
FL	1
IL	1
MI	1
OH	1

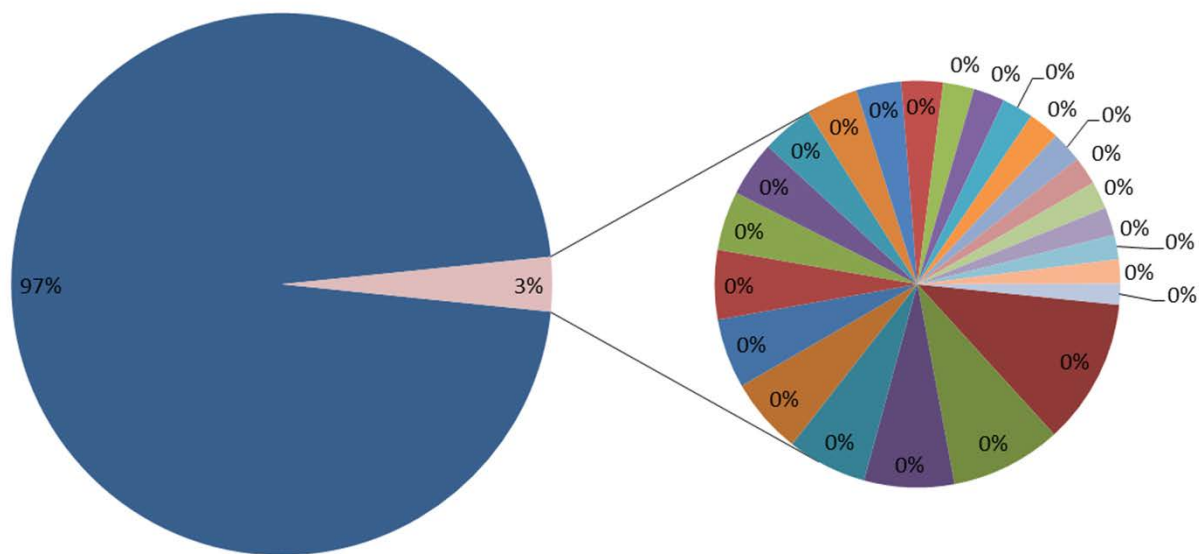
Top Ten Last Visited States by Boaters on Lake Champlain for the 2013 Season



Top 25 Last Most Commonly Visited Waterbodies



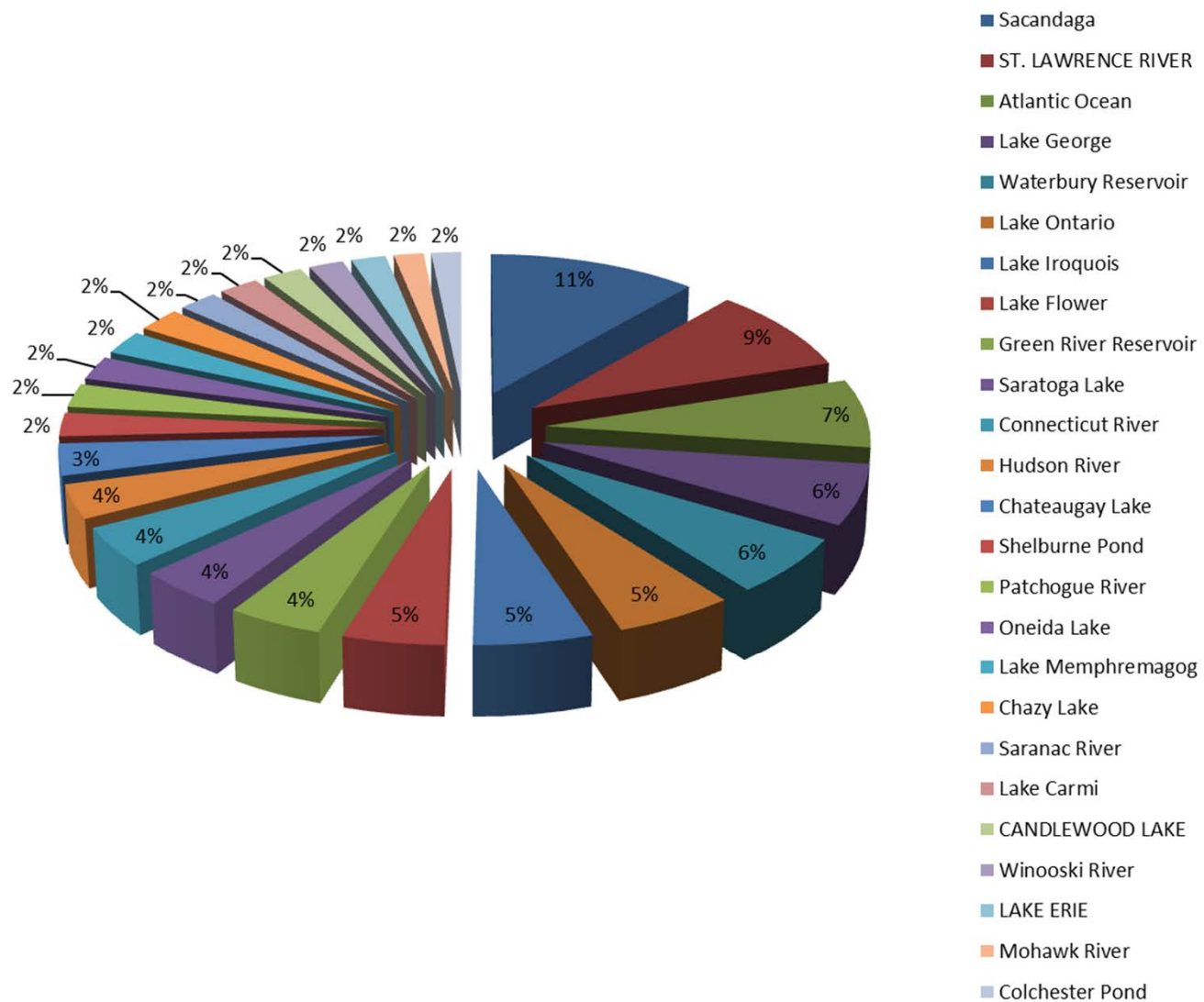
Anticipated Next Waterbody to be Visited - Top 25



Lake Champlain

10801

Anticipated Next Waterbody to be Visited - Top 25, not including Lake Champlain



	Sources of Identified Invasives Entering Lake Champlain			
	Aquatic Organism ID			
Last Waterbody Visited (2 wks)	EWM Eurasian Watermilfoil	VLM Variable Leaf Milfoil	Unidentified	Grand Total
Chazy Lake		1		1
Lake George	1			1
Oneida Lake	1			1
Other	1		1	2
St. Lawrence River	1			1
Auger Lake	1			1
Shelburne Pond	1		1	2
Grand Total	6	1	2	9

Identified Invasive Species Leaving Lake Champlain w/ Next Body of Water					
	Aquatic Organism ID				
Count of Aquatic Organism ID	Aquatic Organism ID				
Next Waterbody to be Visited?	EWM Eurasian Watermilfoil	CLP Curly Leaf Pondweed	Other	Unidentified	Grand Total
Lake George	3				3
Bristol Pond	1		1		2
Atlantic Ocean		1			1
Big Averill				1	1
Big Pond	1				1
Canadian Lakes North of Montreal		1			1
Cayuga Lake	1				1
Chateaugay Lake	1				1
Great Sacandaga		1			1
Green River Reservoir			1		1
Hudson River	1				1
Lac Viceroy			1		1
Lake Dunmore	1				1
Lake Memphremegog		1			1
Lamoille River				1	1
Marshfield Dam	1				1
Oneida Lake				1	1
Saratoga	1				1
Susquehanna River			1		1
Winooski River			1		1
Grand Total	11	4	5	3	23

Regional Stewardship Program Managers work together to develop a strategic boat inspection and decontamination plan for the Adirondack Region



Lake Champlain + Lake George + Paul Smiths College

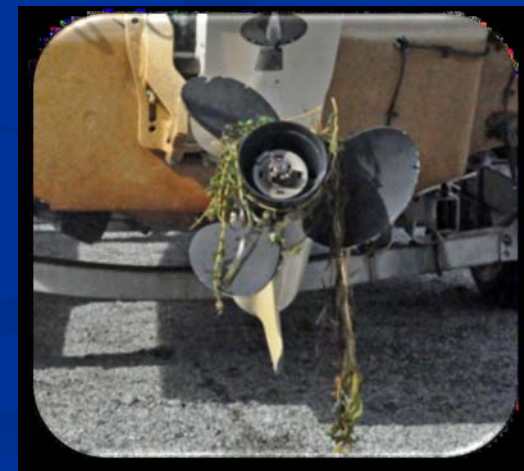


Overland transport pathway

Translocation of organisms by boaters can be intentional (e.g., as bait; Keller et al. 2007), but is **often unintentional** (Johnson et al. 2001; Puth and Post 2005), with **organisms inadvertently carried in bilge water, live wells, and bait buckets.**

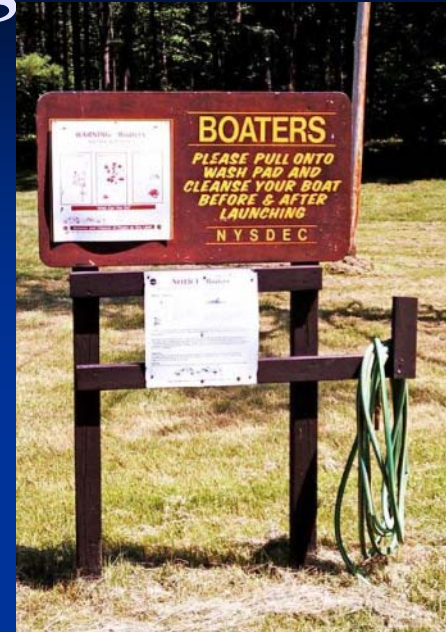
Organisms can also be entrained on boat exteriors, e.g., **entangled on propellers & trailers, attached to other entangled organisms** (Johnson et al. 2001).

Thus, every time a boat is transported overland after use in an invaded waterway, there is the possibility that it will transfer AIS to uninvaded waterways.


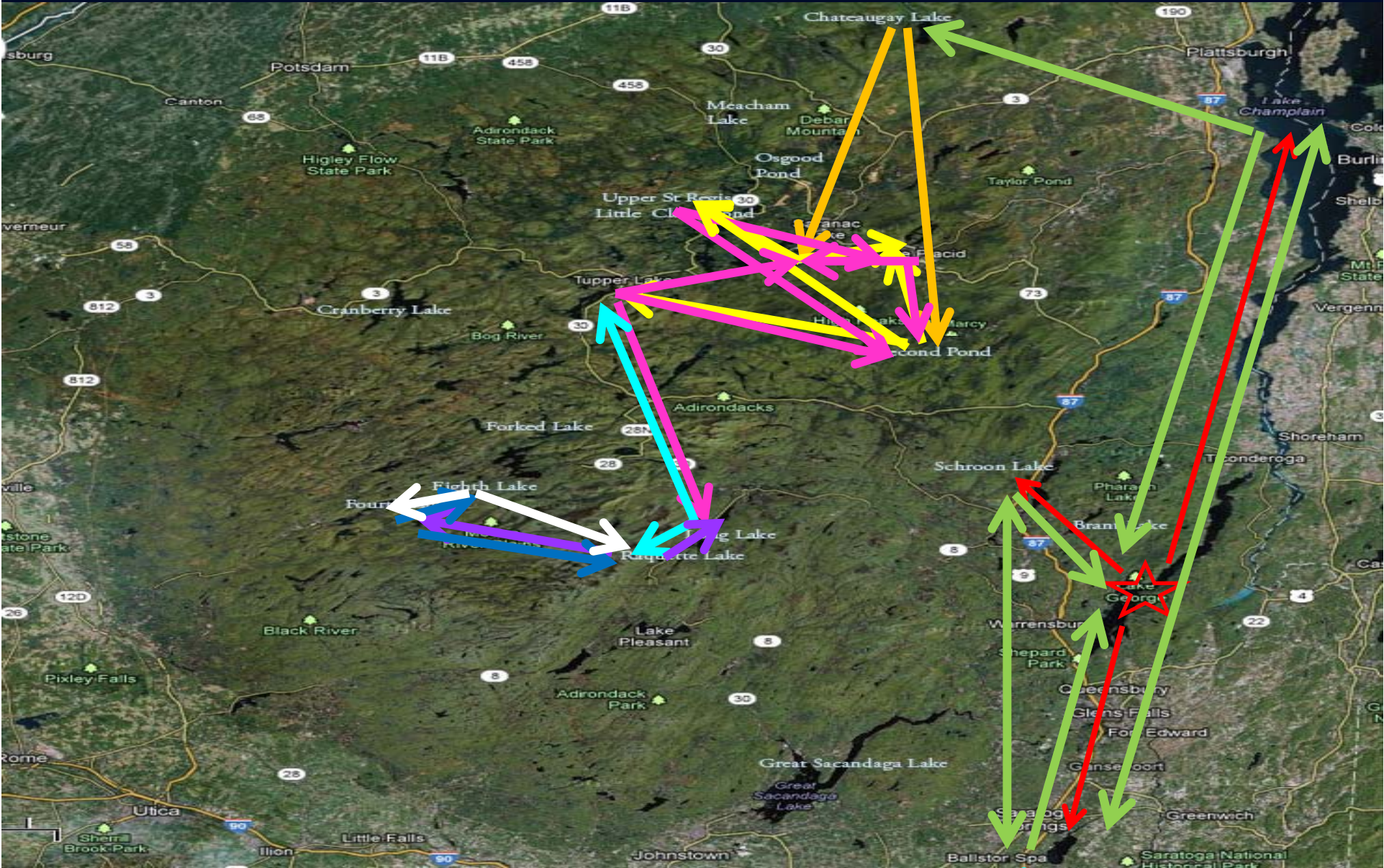


Plants and small bodied organisms


- Visual inspection and hand removal can reduce the amount of **PLANTS** on boats by $88\% \pm 5\%$ (mean \pm SE), with high-pressure washing equally as effective ($83\% \pm 4\%$) and low-pressure washing less so ($62\% \pm 3\%$ removal rate).
- For removing **small-bodied organisms**, high-pressure washing was most effective with a $91\% \pm 2\%$ removal rate; low-pressure washing and hand removal were less effective ($74\% \pm 6\%$ and $65\% \pm 4\%$ removal rates, respectively).
(Roethlisberger)



Sample Possible Spread of AIS based on column J in AIS Threat Analysis



Point of introduction
1st level of spread
2nd level of spread



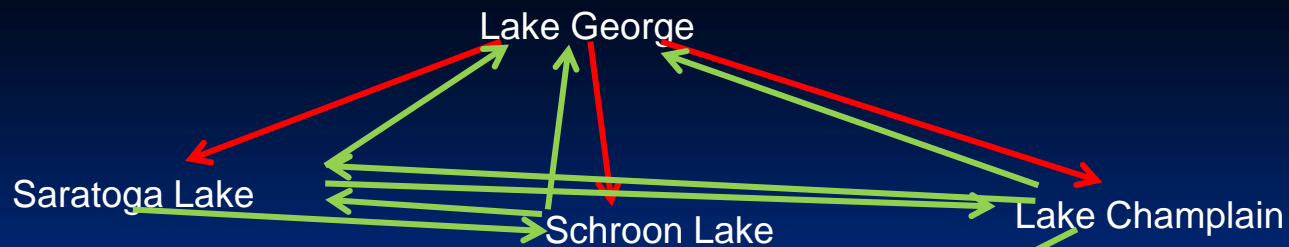
3rd level of spread
4th level of spread
5th level of spread

6th level of spread

7th level of spread

8th level of spread

9th level of spread



Example of a point of introduction and then possible pathways of spread based on lake steward program data and the most frequently occurring outbound waterbody connections within ADK steward network.

In this example – the new introduction is in Lake George. From there – spread goes to Schroon Lake, Saratoga Lake, and Lake Champlain. After this initial spread, boats seem to move in between these lakes a fair bit – however – Lake Champlain opens up the door to Chateaugay Lake –which then opens up the spread to Lake Flower and Second Pond. From here – boats again seem to move around a few main lakes – between Upper St Regis, Lake Placid, Second Pond, and Lake Flower – but then Second Pond opens up the way to Tupper Lake – which opens up the way to Long Lake – which connects to Raquette Lake – which connects to Fourth Lake – and so on. So the spread continues in this fashion. There seem to be groups of lakes (based on proximity of location) – that boats seem to be going in between fairly regularly – and then a lake outside of that main group – that opens up the spread to a new group of lakes. Interestingly, in this example, after the 9th level of spread, the pathway dies out.

